We claim:

1. A lighting control network recovery system for a wireless network of lighting elements, comprising:

a plurality of ballasts each of said plurality of ballasts being configured both as a slave element and a replacement network master control unit;

one of said plurality of ballasts configured as a network master control unit to control each of said plurality of ballasts as a slave element,

wherein, when a network master control unit no longer functions, one of said plurality of ballasts configured as a replacement network master control unit takes its place by becoming a new network master control unit and taking control of the lighting control network.

2. The system of claim 1, further comprising:

at least one remote control unit having a plurality of keys; and

at least one main power line having said ballasts connected thereto such that:

a. the one of said ballasts that is configured as a network master control unit is adapted to setup the network configuration of the lighting control network on power-up reset by recording the registration of each slave element and the association of each slave element with at least one key of the at least one remote control and to control said lighting control network thereafter, and

b. each of said plurality of ballasts, other than said network master control unit, that is configured as a slave element is adapted to join a lighting control network on power-up reset by registering with the network master control unit and associating with at least one of said plurality of keys of said at least one remote control unit.

3. The system of claim 2, wherein said at least one remote control unit is configured as a slave element and said at least one remote control unit is connected first to the network master control unit before any of said plurality of ballasts configured both as a slave element and a replacement network master control unit.

4. The system of claim 2, further comprising:

a non-volatile memory (NVM) associated with the network master control unit and each said slave element; and

a pairing-link table stored in the non-volatile memory of the network master control unit and each slave element, having an initialization as empty and adapted to store

c. a registration termed an "enumeration" of each said slave element that registers with the network master control unit such that the slave element is listed in the paring link table of the network master control unit, and

d. a binding of each said slave element listed in said pairing-link table with at least one of said plurality of keys of said at least one remote control unit, such that the binding is recorded in the paring link table of the network master control unit,

wherein, the network is established by the network master control unit once setup is accomplished and every time the pairing-link table is updated the network master control unit transmits the update to each said slave element.

5. The system of claim 4, further comprising:

a periodically transmitted beacon packet by the network master control unit to each said slave element, said packet having status information of the network master control unit and being transmitted with frequency *F*;

a periodically transmitted wakeup message by each said slave element to the network

master control unit, said message being transmitted with the predetermined frequency *F* and at a predetermined point in time;

wherein, when a slave element determines that the master is not working from at least one of the status beacon packet and the wakeup message, the slave element waits a given delay time *D* and then starts to convert itself to a new network master control unit such that the first said element to discover the network master control unit is not working becomes a new network master control unit and such that network recovery takes place automatically with no need to set up the network control configuration again, and

wherein the new network master control unit switches to master status using a master code that has already been stored in its memory, establishes a new network using a same network ID that the previous network master control unit used and begins to act as a network master control unit for the new network using the same network ID, informs each said slave element to listen for a beacon from the new network master control unit and to send a wake up message to the new network master control unit, and updates the pairing-link table of the new network master control unit and transmits the updated pairing-link table to each said slave element for storage in its NVM.

6. The system of claim 2, wherein on power-up reset:

if the network master control unit has a network ID stored in its non-volatile memory then it has been a master before and if the ID is in use the network master control unit enumerates as a slave element to the new master of the network with the ID, and if the ID is not in use then the network master control reestablishes that network using the ID and pairing-link table so that the network can be recovered after a temporary power interruption, otherwise it has not been a master before, a random ID is generated and stored in its non-volatile memory and its network is established having the randomly generated network ID; and

if the slave element has a network ID stored in its non-volatile memory it has been a slave element in that network before and it rejoins that network so that the network connection is recovered after a temporary power interruption, otherwise it has not been a slave element in a network before and it tries to enumerate to a network master control unit in its radio frequency vicinity.

7. The system of claim 6, wherein the system is implemented using a low power consumption, two-way wireless communication standard having a protocol and comprising a radio, a physical layer, a data link layer, and a an application layer.

8. The system of claim 7, wherein the two-way wireless communication standard is Zigbee™ and the protocol is Protocol for Universal Radio Link (PURL).

9. A method for recovery control of a wireless lighting control network, comprising the steps of:

providing a plurality of ballasts wherein each of said plurality of ballasts is configured both as a slave element and a replacement network master control unit;

providing one of said provided plurality of ballasts configured as a network master control unit to control each of said plurality of ballasts as a slave element;

when the network master control unit no longer functions, replacing the network master control unit with one of said plurality of provided ballasts configured as a replacement network master control unit; and

communicating with each slave element to become a new network master control unit and take control of the lighting control network by the replacement network master control unit.

10. The method of claim 9, further comprising the steps of:

providing at least one remote control unit having a plurality of keys;

providing at least one main power line having said ballasts connected thereto;

on power-up reset performing the steps of:

i. setting up the network configuration of the lighting control network by the network master control unit, by performing the substeps of -

- registering each said slave element with the network master, and
- associating each registered slave element with one of said plurality of keys of said at least one remote control unit; and

ii. controlling the lighting control network by the network master control unit.

11. The method of claim 10, further comprising the steps of:

configuring said at least one remote control unit is as a slave element, and

registering said at least one remote control unit with the network master control unit first.

12. The method of claim 10, further comprising the steps of:

associating a non-volatile memory with the network master control unit and each said slave element;

providing a pairing-link table in the non-volatile memory of the network master control unit;

initializing each said provided pairing-link table as empty;

enumerating each said slave element that registers with the network master control unit in the paring link table of the network master control unit;

binding each said slave element enumerated in said pairing-link table with at least one of said plurality of keys of said at least one remote control unit;

recording the bound slave element and its corresponding remote control key as updates in the paring link table of the network master control unit;

informing each slave element of the recorded update made by the network master control unit to its pairing-link table; and

updating by the slave element of its pairing-link table with the information of the recorded updates made by the network master control table.

13. The method of claim 12, further comprising the steps of:

periodically and at a frequency *F*, transmitting a beacon packet by the network master control unit to each said slave element that includes status information of the network master control unit;

periodically and at a frequency *F* and at a predetermined point in time, transmitting a wakeup message by each said slave element to the network master control unit;

when a slave element determines that the master is not working from at least one of the transmitted status beacon packet and wakeup message, performing the following steps:

a. waiting a given delay *D* by the slave element, and

b. when *D* times out, converting itself by the slave element to a new network master control unit;

when a master code is already stored in the memory of the new network master control unit, establishing a network with the same network ID that the previous network master control unit used;

beginning to act as a network master control unit for the new network;

informing each said slave element to listen for a beacon from the new network master control unit and to send a wake up message to the new network master control unit;

updating the pairing-link table of the new network master control unit; and

transmitting the updated pairing-link table to each said slave element.

14. The method of claim 10, on power-up reset further performing the steps of:

enumerating as a slave element to a new network master control unit with this ID if the network master control unit has a network ID stored in its memory that is already in use;

reestablishing the network by the network master control unit with its stored ID if it is not in use and with its stored pairing-link table;

when there is no network ID stored in the memory of the network master control unit, performing the steps of:

a. randomly generating a network ID,

b. storing the ID in its non-volatile memory, and

c. establishing its network using the randomly generated network ID, and

if a slave element has a network ID stored in its non-volatile memory, rejoining that network by the slave element; and

if a slave element does not have a network ID stored in its non-volatile memory, trying to enumerate to a network master control unit in its radio frequency vicinity by the slave element.

15. A system with a low power consumption, two-way wireless communication standard having a protocol and comprising a radio, a physical layer, a data link layer, and an application layer that performs the method of claim 14.

16. The system of claim 15, wherein the two-way wireless communication standard is Zigbee™ and the protocol is Protocol for Universal Radio Link (PURL).